Participant Questionnaire

Participant number: 12 Date: 7/3/2023

Location: Brescia, IT

HRC Study / Algorithms tested: HAMP, STAP-PPF

Study Conducted by: Jared Flowers

Participant link lengths/dimensions: (**meters**, "spine" is pelvis to shoulder midpoint, "shoulders" is shoulder to shoulder)

Spine	
Neck	
Shoulders	.30

Left Upper Arm	.29
Left Forearm	.25

Right Upper Arm	.29
Right Forearm	.26

Participant joint diameter: (**meters**)

Left Elbow	.095
Left Wrist	.06

Right Elbow	.09
Right Wrist	.06

Questions:

A. How safe did you feel? (0 is not safe at all, 5 is neutral, 10 is very safe)

B. Do you think the robot hindered your motions during the task? (0 is robot completely prevented your motions, 5 is neutral, 10 is robot did not impede you motion)

C. Did the robot perform logical motions? (0 is robot motions made no sense to you, 5 is neutral, 10 is robot motions made sense to you)

D. What is your overall satisfaction with the HRC task? (0 is you would not work in this HRC cell again, 5 is neutral, 10 is you enjoyed working in this cell with the robot)

For Task 1 (engine parts): (circle your answer to each question)

Task 1, Method 1: 1

Question A: (0 is not safe at all, 5 is neutral, 10 is very safe)

0 1 2 3 4 5 6 7 **8** 9 10

Question B: (0 is robot completely prevented your motions, 5 is neutral, 10 is robot did not impede you motion)

0 1 2 3 4 5 6 7 8 **9** 10

Question C: (0 is robot motions made no sense to you, 5 is neutral, 10 is robot motions made sense to you)

0 1 2 3 4 **5** 6 7 8 9 10

Question D: (0 is you would not work in this HRC cell again, 5 is neutral, 10 is you enjoyed working in this cell with the robot)

0 1 2 3 4 5 6 **7** 8 9 10

Task 1, Method 2: 3

Question A: (0 is not safe at all, 5 is neutral, 10 is very safe)

0 1 2 3 4 5 **6** 7 8 9 10

Question B: (0 is robot completely prevented your motions, 5 is neutral, 10 is robot did not impede you motion)

0 1 2 3 4 5 6 7 **8** 9 10

Question C: (0 is robot motions made no sense to you, 5 is neutral, 10 is robot motions made sense to you)

0 1 2 3 **4** 5 6 7 8 9 10

Question D: (0 is you would not work in this HRC cell again, 5 is neutral, 10 is you enjoyed working in this cell with the robot)

0 1 2 3 4 5 6 **7** 8 9 10

Task 1, Method 3: 2

Question A: (0 is not safe at all, 5 is neutral, 10 is very safe)

0 1 2 3 4 5 6 7 **8** 9 10

Question B: (0 is robot completely prevented your motions, 5 is neutral, 10 is robot did not impede you motion)

0 1 2 3 4 5 6 7 8 **9** 10

Question C: (0 is robot motions made no sense to you, 5 is neutral, 10 is robot motions made sense to you)

0 1 2 3 4 5 **6** 7 8 9 10

Question D: (0 is you would not work in this HRC cell again, 5 is neutral, 10 is you enjoyed working in this cell with the robot)

0 1 2 3 4 5 6 7 **8** 9 10

Experience: 4

Comments:

First task:

- I didn't quite get why the robot kept stopping even when the human wasn't that close
- In method 2 and 3 I could not understand the reason behind some re-orientations of the end-effector (maybe expected when planning in the joint-space ?)

Participant number: 12 Date: 7/3/2023

For Task 2 (Sharework parts: metal tabs, cylinders, pallets): (circle your answer to each question)

Task 2, Method 1: 1

Question A: (0 is not safe at all, 5 is neutral, 10 is very safe)

0 1 2 3 4 5 6 7 8 ~~9~~ 10

Question B: (0 is robot completely prevented your motions, 5 is neutral, 10 is robot did not impede you motion)

0 1 2 3 4 5 6 7 8 ~~9~~ 10

Question C: (0 is robot motions made no sense to you, 5 is neutral, 10 is robot motions made sense to you)

0 1 2 3 4 5 ~~6~~ 7 8 9 10

Question D: (0 is you would not work in this HRC cell again, 5 is neutral, 10 is you enjoyed working in this cell with the robot)

0 1 2 3 4 5 ~~6~~ 7 8 9 10

Task 2, Method 2: 3

Question A: (0 is not safe at all, 5 is neutral, 10 is very safe)

0 1 2 3 4 5 6 7 8 ~~9~~ 10

Question B: (0 is robot completely prevented your motions, 5 is neutral, 10 is robot did not impede you motion)

0 1 2 3 4 5 6 7 8 9 ~~10~~

Question C: (0 is robot motions made no sense to you, 5 is neutral, 10 is robot motions made sense to you)

0 1 2 3 4 5 6 7 8 ~~9~~ 10

Question D: (0 is you would not work in this HRC cell again, 5 is neutral, 10 is you enjoyed working in this cell with the robot)

0 1 2 3 4 5 6 7 ~~8~~ 9 10

Task 2, Method 3: 2

Question A: (0 is not safe at all, 5 is neutral, 10 is very safe)

0 1 2 3 4 5 ~~6~~ 7 8 9 10

Question B: (0 is robot completely prevented your motions, 5 is neutral, 10 is robot did not impede you motion)

0 1 2 3 4 5 6 7 ~~8~~ 9 10

Question C: (0 is robot motions made no sense to you, 5 is neutral, 10 is robot motions made sense to you)

0 1 2 3 ~~4~~ 5 6 7 8 9 10

Question D: (0 is you would not work in this HRC cell again, 5 is neutral, 10 is you enjoyed working in this cell with the robot)

0 1 2 3 4 ~~5~~ 6 7 8 9 10

Comments: T2-m4: A 5, B 5, C 9, D ~~8~~ 7

T2-m5: A ~~8~~ 5, B ~~8~~ 4, C ~~8~~ 8, D ~~8~~ 7

In some cases, it seemed to me that the reaction to the human motion was somewhat laggy. Maybe is it hard for the estimation algorithm to keep up ~~with~~ with robot motions?

Participant number: 12 Date: 7/3/2023